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ABSTRACT

Expanding on the World Wide Web levels of use as defined on the "Courses on the Web" Web site at Oregon State University, this paper presents a structure which emphasizes K-12 assignments based on Web use while de-emphasizing the glitz of the Web. The educator purposefully designs a Web-based assignment which adheres to the unit objectives and is appropriate to the environment in which it will be used. Therefore, assignments will be varied according to connectivity, accessibility, student skills, and classroom goals and objectives. The "levels of Web use" background allows teachers to begin with tightly focused assignments that make small and appropriate use of online resources, then builds to more complex assignments as they experience success and develop confidence in their ability to use Web resources effectively. A description is provided of each of the following levels of Web use and URLs that exemplify that level of use: (1) informational use of the Web; (2) supplemental use of the Web; (3) dependent use of the Web; and (4) fully developed courses delivered on the Web. Advantages of a context for Web use are then discussed. (AEF)

# Establishing a Framework Useful for Developing Web-Based Assignments in K-12 Education

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The World Wide Web! It's hyper, it's dynamic, it's complex. It's overwhelming! As K-12 teachers or preservice teachers struggle with integrating Web resources into classroom assignments and projects, it's often difficult for them to focus with yet another wonderful resource only one click away. The advantages of using the Web; however, make it imperative that teachers be able to use it effectively. As we work with K-12 teachers, preservice teachers, and education professors, we have found that looking at Web resource use in the following framework has proven beneficial. After introducing the Web in this way in an educational media course, one of the graduate students, a fifth grade teacher, said:

At the recent teacher's convention I attended two Internet sessions, and both facilitators handed out a list of Web resources and said, "Explore." Applying this framework to Web resources will really help as I develop Web assignments for my fifth graders. I wish I had had this structure before I did the exploring at the convention.

Expanding on the Web levels of use as defined on the "Courses on the Web" page at Oregon State University (http://www.orst.edu/fe/extedu/couvia/), we devised the following structure which emphasizes assignments based on Web use while de-emphasizing the glitz of the Web. The educator purposefully designs a Web-based assignment which adheres to the unit objectives and is appropriate to the environment in which it will be used. Therefore, assignments will be varied according to connectivity, accessibility, student skills, and, of course, classroom goals and objectives.

## The Framework: Levels of Web Use

The "levels of Web use" background helps prevent teachers from experiencing that overwhelmed feeling. It allows them to begin with tightly focused assignments that make small and appropriate use of on-line resources, then builds to more complex assignments as they experience success and develop confidence in their ability to use Web resources effectively. What follows is a description of each level of Web use and URL's that exemplify that level of use.

### Level One: Informational Use of the Web

This level of Web use contributes to the teacher's ability to disseminate information in on-line form. It is often used to post syllabi, assignments, reviews, sample exams, frequently-asked-questions about an assignment, and even personal and student-friendly information about the teacher. It often takes the shape of a teacher's personal home page. Initially, the information posted may also be distributed in print form to the students, thus making the on-line form an optional source. If, for example, (or should we say when) a student forgets assignment information at home, the student can access the information on-line, preventing teacher interruptions. Vice versa, students and parents with at-home connectivity can access the assignment via the Web.

Posting information on the Web has advantages for both the teacher and student. It is an easy way to become involved in Web use and aids in developing Web navigational skills while teaching students the basic mechanics of Web browser use. In Wisconsin, all it takes is a small blizzard to upset schedules! Adjusting assignment procedures and timelines posted on-line is quick, efficient, and could possibly be done from the teacher's home during the blizzard!

Here are some examples of the informational Web use level:

- Mount St. Joseph High School Foreign Language Department: http://www.msjnet.edu/for-lang.html
  This site provides information about the school's foreign language department. It lists the languages taught and explains the school's language requirement, facilities, and placement policies. Current and future students, parents, counselors, teachers, and administrators can make use of the information.
- Elementary School Media Specialist Home Page: Jennifer Burger: http://comp.uark.edu/~jburger/
  Ms. Burger's home page invites students to get to know her better. Note her use of color, cartoons, and catchy

link titles. Students can develop a sense of Ms. Burger's personality so when they go to the Media Center they may already feel some rapport with her. This site not only helps teachers and students gather a "sense" of Ms. Burger, but Ms. Burger also provides some easy to use links for both teachers and students, thus, providing additional information and resources.

- Dr. Linda Shadiow's Home Page: http://www.nau.edu/~cee/faculty/l.shadiow/l.shadiow.html
  This Northern Arizona University professor's home page is a good example of how the informational Web use level can be used for distributing information on preservice education courses.

### Level Two: Supplemental Use of the Web

Supplemental Web use implies that Web resources are used in addition to traditional resources. A well-designed assignment does not fail if Web resources cannot be employed; however, accessing the Web resources through a live connection may enhance and enrich the assignment. It may also provide additional motivation for students to complete the assignment. Web resources can include basic information published by the teacher, but they also can be part of a required or optional assignment to use resources others have placed on the Web. In fact, the majority of supplemental uses include accessing already published Web pages. Some examples of supplemental use encompass using a Web page as one resource, along with print resources, when researching a topic; using a Web page for resource evaluation and critical thinking activities; and locating Web resources through simple key-word search techniques. Students may also be asked to go to a specific site and locate/read/summarize some specific information or a Web-based document.

Some examples of sites that can be used at the supplemental level include:

- Currency Converter: http://www.oanda.com/cgi-bin/ncc
  A middle school business education teacher uses this site as she teaches her students spreadsheet basics. Each student chooses a country and for two weeks tracks the currency conversion rate for that country. The students enter their data in the spreadsheet program and then produce a line graph using the data. The line graph also includes a flag of the country found and downloaded from a Web site. Although the assignment would be successful using non-Web data, the combination of using the currency converter and bringing in images from the Web enriches the assignment.
- The Whitehouse: http://www.whitehouse.gov/WH/glimpse/tour/html/index.html
  Two kindergarten teachers who develop their u...'s around a housing theme, chose the Whitehouse as their theme for February, Presidents' month. The students partake in an on-line field trip, a virtual, historic tour of the Whitehouse. Following the tour, the students design a president's home of their own, naming the rooms and assigning room locations. In addition, the students compose an electronic mail message to the President.
- The Nine Planets: http://www.seds.org/billa/tnp/
  This site is one of several sites preservice students choose from as they complete a Web resource evaluation form. The site critique form involes critically analyzing the site, including appropriate vocabulary for the age level the site is designed for, appropriate linkages, linkages placed appropriately, site continuity, currency, quality and accurate information, and diverse site use.

### Level Three: Dependent Use of the Web

In level three, classes continue to meet in a traditional classroom; however, the Web becomes a critical component of a course, a project, or an assignment. Often a majority of the course materials and resources are on the Web, and students can access the material only through the Web. The Web provides access to simulations, exercises, and forms. Links to Web-based activities and resources are usually provided from the teacher's home page or a course home page. Links to relevant resources may also be provided and a certain number of Web-based resources may be required in a research project or presentation. One note of warning, however, as we develop more complex Web projects, we need a back-up plan just in case the technology goes awry, or the sites that we plan to use disappear, move, or change content.

Some examples of dependently used Web sites include:

- Sea Mammals Interdisciplinary Project: http://www.bev.net/education/SeaWorld/ and http://www.bev.net/education/SeaWorld/bottlenose_dolphin/48activitydol.html
  Upper elementary teachers use the Sea World Animal Information Database as their students study sea mammals. Each student group chooses a sea mammal and writes a report which must include particular facts they extract from the Sea World Web resources about the sea mammal. At a related site, students learn the Latin prefixes for sea mammal features. In art class, each student uses the Latin prefixes to create and then draw a unique sea mammal. This art lesson, including the Latin prefixes, can be found at the second URL listed for this example.
- Real-Time Relative Humidity Activity: http://www-kgs.colorado.edu/rt_clouds.html
  This project requires students to gather actual humidity data and submit it as part of a nation-wide weather information data gathering activity. Students engage in real scientific data collection and come to understand the weather scientists' role while learning about the range and effect of humidity in their location.

- Explore Wisconsin Project: http://www.cesa10.k12.wi.us/explore-WI/index.htm
  Funded by a Goals 2000 grant, five rural Wisconsin fourth grade teachers collaborated to help their students research Wisconsin history topics and create Web pages to share their research with the students at the other schools. This is an on-going project which this year includes at least one elementary music teacher who is composing an original song about a local manufacturer. The students will record the song for use on their Web page.
- BioChemistry Research Paper Published on the Web: http://www.chem.uwec.edu/Chem406/Webpages/Kat/mypage.html
  Karen Wysocki, a biochemistry student studying under Professor Scott Hartsel at the University of Wisconsin-Eau Claire, won a Distinguished Award in the '97 Wisconsin Web Fair for writing and publishing this Web-based research paper on the enzyme Carbonic Anhydrase. This type of assignment can be used in any discipline, including preservice education, to teach class content as well as Web publishing skills. For more examples of K-16 Distinguished Award Web publishers see the Wisconsin WebFair site: http://webfair.wisc.edu.

### Level Four: Fully Developed Courses Delivered on the Web

Students and faculty participating in a fully developed course may never meet—except through the Web! Fully developed Web courses can serve two purposes. First, they can augment a "traditionally-delivered" course that only meets a few times during the semester. The course content, assignments, communication, and administration is primarily handled on-line. Second, fully-developed Web courses can stand alone. Students and instructors never meet. All content, assignments, discussion, communication, and administration is Web-based. In each case, the course may be supplemented by traditional resources such as books, print library resources, and videos. Timelines differ according to course objectives and purposes. Skill with one or more forms of computer-mediated communication (email, discussion lists, UseNet News, Internet Chats, or groupware) is expected and assumed; Web access is required. Fully developed Web courses force learners to take a greater share of responsibility for their learning. Learners must be self-motivated, good time managers, and demonstrate a high tolerance for on-line glitches. Although most fully-developed Web courses we have seen are directed to adult learners, there are good examples of these courses for high school students as well.

Fully developed web courses are not appropriate for every topic or discipline but can be successful in a range of disciplines. Success requires a carefully planned course that incorporates interaction between the students, between students and course content, and between students and faculty. Other keys to success include availability of technical support in case of difficulties; sufficient interactivity provided by the Web-based course content, and a highly-motivated and supportive instructor (the first time through this will involve a LOT of work!).

Many fully-developed courses require a password in order to access the course itself. The following URLs provide access to the opening pages of fully developed Web courses.

- Advanced Placement European History: http://www.cesa10.k12.wi.us/clustera/apeh/index.htm
  The Cluster A Consortium Schools (five rural Wisconsin School Districts) currently offer this on-line course to qualified students in all five schools. Individually each school would not have sufficient enrollment for the course. Together, they have filled the course and have a waiting list.
- Cool Math 221: http://www.uwp.edu/academic/mathematics/cool.html
  As stated on the Web page, "COOL stands for Calculus Offered On Line. Offered to students via the World Wide Web, its purpose is to reach out to mathematically prepared high school students across the state of Wisconsin and offer them an outstanding educational opportunity." Taught completely on-line, the course is designed to provide students who otherwise might not have it, the opportunity to study calculus before entering college. A math textbook and the software *Mathematica* are integral to the course.
- Flexible Learning System: http://fls.cll.wayne.edu/fls/welcome.htm
  In creating a Web 101 course, the educators at Wayne State University have provided an opportunity for K-12 educators and preservice educators to analyze the structure of an on-line course. What are the issues when developing such a course? What considerations must the developer keep in mind? How many graphics should be used? Does graphical format matter? How does a developer incorporate interactivity in an on-line course? Students have a chance to send their feedback to the developers.
- The Home Education Network: http: //www.then.com/
  Since its inception in the Fall of 1996, The Home Education Network (THEN) has provided over 135 courses to its adult learner audience. Sponsored by UCLA Extension, THEN continually updates its courses and adds new ones.

## Advantages of a Context for Web Use

Defining various levels of Web use expands the array of possibilities for educators in a meaningful way. K-12 educators, preservice education students, and university education professors now have a way of categorizing Web use that will help them manage Web-inclusive assignments.

The levels of Web use framework helps educators focus on clear objectives, well-planned, easy-to-follow activities, and distinct outcomes. This way of looking at Web use aids the teacher who is feeling pressure to use Web resources by providing a growth structure where the teacher starts gradually, simply, and comfortably at the informational or supplemental levels. After some initial successes, dependent Web assignments will not seem overwhelming. Another advantage of focusing and planning through this framework is the ability to create interdisciplinary and intragrade assignments. Language arts and math, social studies and music, science and art represent only a few of the combinations that can be made via the Web. A fifth grader may help a kindergartner develop a Web page; two third graders may create art for a sixth grader's story, a group of preservice education students may divide the task of creating a Web page into writer, coder, image digitalizer, editor, etc. As you can see the possibilities are endless.

We cannot overemphasize the importance of focus and planning. The levels of Web use framework helps educators developing Web assignments to focus, plan, and structure assignments and learning to keep the emphasis on the learning and away from the wow, gee-whiz-bang nature of the Internet.

To see more examples of the Web levels of use see Finder and Raleigh (1997). *Web Applications in the Classroom* [On-line.] Available: http://www.cesa10.k12.wi.us/districts/augusta/levels.htm.

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